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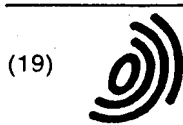
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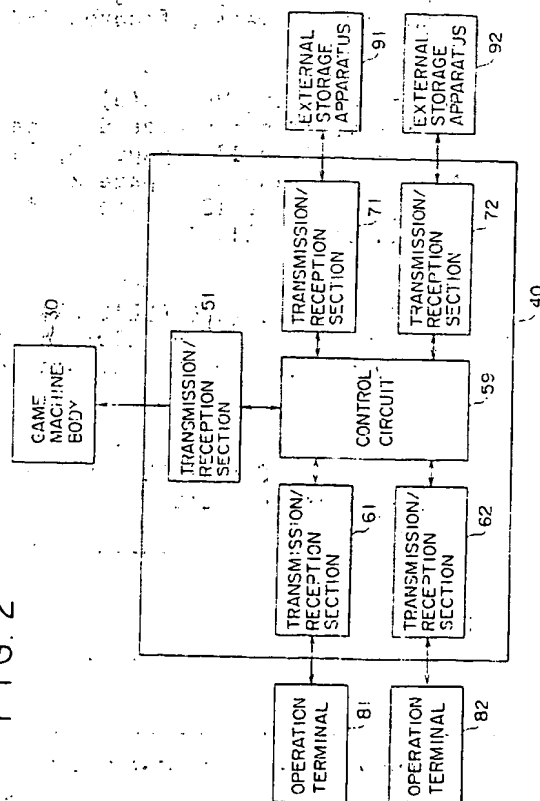
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(54) Game systems and repeaters therefor

(57) The invention provides a game machine and a repeater therefor wherein, even when individual data of operation terminal equipments are to be stored, there is no necessity of re-connecting an external storage apparatus for each of the operation terminal equipments and a sufficient capacity is assured for the storage capacity which can be used for each one operation terminal equipment. The game machine includes a game machine body, a repeater, a pair of operation terminal equipments, and a pair of external storage apparatus. The repeater includes a body-connectable transmission-reception section for connecting the repeater to the game machine body, a pair of terminal equipment-connectable transmission-reception sections for connecting the operation terminal equipments to the repeater, a pair of storage apparatus-connectable transmission-reception sections for connecting the external storage apparatus to the repeater, and a control circuit. The external storage apparatus are provided in a one-by-one corresponding relationship to the operation terminal equipments such that individual data of the operation terminal equipments may be stored into the external storage apparatus, respectively.

FIG. 2



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## Description

This invention relates to game systems, and can be applied to a game machine such as a video game machine, for home use or for individual use, and to repeaters for use with game machines.

A conventionally video game machine for home use or for individual use typically includes an operation terminal equipment such as a control pad to a game machine body. An external storage apparatus such as a memory card which has stored in advance or stores various data regarding operation environment of the operation terminal equipment and process data during playing of a game is connected to the game machine body.

Another video game machine by which a game can be enjoyed by a plurality of players at a time has been developed and put on the market recently. In the video game machine, an operation terminal equipment is not directly connected to a game machine body, but a repeater is connected to the game machine body. To the repeater, a plurality of operation terminal equipments can be simultaneously connected.

However, in the game machine of the type just described wherein a plurality of operation terminal equipments can be simultaneously connected to a game machine body via a repeater, an external storage apparatus is directly connected to the game machine body. Consequently, in order to record individual data of the operation terminal equipments into the external storage apparatus, the external storage apparatus connected to the game machine body must be replaced with another external storage apparatus each time it is intended to store data of a different one of the operation terminal equipments connected to the game machine body via the repeater. Accordingly, cumbersome operations are required when a plurality of players enjoy a game simultaneously using the game machine.

However, it is also possible, for an external storage apparatus connected to a game machine body to be utilized divisionally or commonly by a plurality of operation terminal equipments to store individual data of the operation terminal equipments into the external storage apparatus.

In this instance, however, the capacity of the external storage apparatus which can be used per one operation terminal equipment is limited. When the capacity is insufficient, another external storage apparatus must be re-connected.

Further, in this instance, since the external storage apparatus is utilized in units of a plurality of operation terminal equipments, the operation terminal equipments to be connected to the repeater are limited to operation terminals which are compatible with the external storage apparatus. Accordingly, it is impossible for only some operations to be replaced.

According to an aspect of the present invention, there is provided a repeater for a game machine, which comprises an operation terminal equipment-connecta-

ble transmission-reception section for transmitting and receiving data to and from a plurality of operation terminal equipments, an external storage apparatus-connectable transmission-reception section for transmitting and receiving data to and from a plurality of external storage apparatus corresponding to the plurality of operation terminal equipments, a game machine-connectable transmission-reception section for serially transmitting and receiving data to and from a game machine body, and control means for selectively connecting the game machine-connectable transmission-reception section to the operation terminal equipment-connectable transmission-reception section or the external storage apparatus-connectable transmission-reception section.

According to another aspect of the present invention, there is provided a game system, which comprises a game machine body having an operation terminal equipment-connectable connection section, and a repeater connectable to the operation terminal equipment-connectable connection section by serial communication and allowing connection thereto of a plurality of operation terminal equipments and a plurality of external storage apparatus individually corresponding to the plurality of operation terminal equipments by serial communication, the repeater including control means for selectively connecting the plurality of operation terminal equipments and the plurality of external storage apparatus connected thereto to the game machine body.

In game machines and repeaters for game machines embodying the invention having the constructions described above, a plurality of external storage apparatus can be simultaneously connected to the repeater. Consequently, for example, by connecting a plurality of external storage apparatus in a one-by-one corresponding relationship to a plurality of operation terminal equipments connected to the repeater so that individual data of the operation terminal equipments may be stored into the respective external storage apparatus, any external storage apparatus need not be re-connected for any of the operation terminal equipments connected to the repeater. Further, a sufficient capacity can be assured for the capacity of an external storage apparatus which can be used for each one operation terminal equipment.

Embodiments of the present invention provide a game machine and a repeater therefor wherein, even when individual data of operation terminal equipments are to be stored, there is no necessity of re-connecting an external storage apparatus for each of the operation terminal equipments and a sufficient capacity is assured for the storage capacity which can be used for each one operation terminal equipment.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which like parts or elements are denoted by like reference characters, and in which:



FIG. 1 is a schematic view showing a game machine system in which a game machine and a repeater for the game machine embodying to the present invention are incorporated:

FIG. 2 is a functional block diagram of the game machine shown in FIG. 1;

FIG. 3 is a block diagram illustrating signals and data communicated between a game machine body and operation terminal equipments and external storage apparatus of the game machine system shown in FIG. 1;

FIG. 4 is a functional block diagram showing an exemplary construction of the operation terminal equipments shown in FIG. 1;

FIG. 5 is a similar view but showing an exemplary one of the external storage apparatus shown in FIG. 1;

FIG. 6 is a diagram illustrating communications between the game machine body and the operation terminal equipments and external storage apparatus shown in FIG. 1;

FIGS. 7A to 7D are diagrammatic views illustrating exemplary data communicated between the game machine body and the operation terminal equipments and external storage apparatus shown in FIG. 1;

FIGS. 8A to 8D are diagrammatic views illustrating a communication procedure between the game machine body and the external storage apparatus shown in FIG. 1 by a packet;

FIGS. 9A to 9E are time charts illustrating communication timings between the game machine body and the operation terminal equipments and external storage apparatus shown in FIG. 1; and

FIGS. 10 to 12 are diagrammatic view showing different constructions of the repeater shown in FIG. 1.

Referring first to FIG. 1, there is shown a game machine system in which a game machine embodying the present invention is incorporated. The game machine system shown includes a video audio outputting apparatus 10 such as a television receiver, and a game machine 20 connected to the video audio outputting apparatus 10. The game machine 20 includes a game machine body 30 connected to the video audio outputting apparatus 10, and a repeater 40 connected to the game machine body 30. A pair of operation terminal equipments 81 and 82 can be simultaneously connected to the repeater 40, and also a pair of external storage apparatus 91 and 92 can be simultaneously connected to the repeater 40. The external storage apparatus 91 and 92 are formed, for example, as memory cards.

The operation terminal equipment 81 and the external storage apparatus 91, and the operation terminal equipment 82 and the external storage apparatus 92, have connection sections individually disposed in a juxtaposed relationship at upper and lower stages so that the corresponding relationship among them can be

identified readily.

Referring now to FIG. 2, the repeater 40 includes a body-connectable transmission-reception section 51, a pair of terminal equipment-connectable transmission-reception sections 61 and 62, a pair of storage apparatus-connectable transmission-reception sections 71 and 72; and a control circuit 59.

The body-connectable transmission-reception section 51 connects the repeater 40 to the game machine body 30 and communicates data with the game machine body 30 by serial communications. In the arrangement shown, the body-connectable transmission-reception section 51 is connected to a terminal equipment-connectable transmission-reception section (not shown) of the game machine body 30.

The terminal equipment-connectable transmission-reception sections 61 and 62 connect the operation terminal equipments 81 and 82 to the repeater 40 and communicate data with the operation terminal equipments 81 and 82 by serial communications, respectively.

The storage apparatus-connectable transmission-reception sections 71 and 72 connect the external storage apparatus 91 and 92 to the repeater 40 and communicate data with the external storage apparatus 91 and 92 by serial communications, respectively.

The control circuit 59 performs conversion and selection of data from and to the game machine body 30 connected to the body-connectable transmission-reception section 51; the operation terminal equipments 81 and 82 connected to the terminal equipment-connectable transmission-reception sections 61 and 62, and the external storage apparatus 91 and 92 connected to the storage apparatus-connectable transmission-reception sections 71 and 72.

In particular, data from the operation terminal equipments 81 and 82 are received by the terminal equipment-connectable transmission-reception sections 61 and 62 and undergo necessary conversion by the control circuit 59. Then, some of the data are stored into a buffer memory not shown. Further, the data from the operation terminal equipments 81 and 82 are collectively transmitted from the body-connectable transmission-reception section 51 to the game machine body 30.

Data from the external storage apparatus 91 and 92 are received by the storage apparatus-connectable transmission-reception sections 71 and 72 and then undergo necessary conversion by the control circuit 59. Thereafter, they are transmitted from the body-connectable transmission-reception section 51 to the game machine body 30.

Data from the game machine body 30 to the operation terminal equipments 81 and 82 are received by the body-connectable transmission-reception section 51 and undergo necessary conversion by the control circuit 59. Thereafter, those data which are designated as data to be sent to the operation terminal equipment 81 by the game machine body 30 are transmitted from the terminal equipment-connectable transmission-reception



section 61 to the operation terminal equipment 81. On the other hand, those data which are designated as data to be sent to the operation terminal equipment 82 are transmitted from the terminal equipment-connectable transmission-reception section 62 to the operation terminal equipment 82.

Data from the game machine body 30 to the external storage apparatus 91 and 92 are received by the body-connectable transmission-reception section 51 and undergo necessary conversion by the control circuit 59. Then, those data which are designated as data to be sent to the external storage apparatus 91 by the game machine body 30 are transmitted from the storage apparatus-connectable transmission-reception section 71 to the external storage apparatus 91. Meanwhile, those data which are designated as data to be sent to the external storage apparatus 92 by the game machine body 30 are transmitted from the storage apparatus-connectable transmission-reception section 72 to the external storage apparatus 92.

In this instance, the external storage apparatus 91 and 92 connected to the storage apparatus-connectable transmission-reception sections 71 and 72 of the repeater 40 are provided in a one-by-one corresponding relationship to the operation terminal equipments 81 and 82 connected to the terminal equipment-connectable transmission-reception sections 61 and 62 so that individual data of the operation terminal equipments 81 and 82 are stored into the external storage apparatus 91 and 92, respectively.

Signals and data which are communicated between the game machine body 30 and the operation terminal equipments 81 and 82 and external storage apparatus 91 and 92 via the repeater 40 are illustrated in FIG. 3. Referring to FIG. 3, the signals and data include a communications starting notification signal DTR transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92, a starting acceptance signal DSR transmitted from the operation terminal equipments 81 and 82 or the external storage apparatus 91 and 92 to the game machine body 30, transmission data TXD transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92, transmission data RXD transmitted from the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 to the game machine body 30, and a serial clock signal SCK transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92.

Referring now to FIG. 4, each of the operation terminal equipments 81 and 82 includes a control section 1 formed from a CPU, a ROM in which a control program to be executed by the CPU and so forth are written, and a RAM used as a working area of the CPU. A serial I-O port 2 is provided on a side of the control section 1 which is connected to the repeater 40. Meanwhile, a parallel

I-O port 3 is provided on the other side of the control section 1 which is connected to switches SW which form a manually operable elements of each of the operation terminal equipments 81 and 82.

Referring now to FIG. 5, each of the external storage apparatus 91 and 92 includes a control section 5 formed from a CPU, a ROM and a RAM. A serial I-O port 6 is provided on a side of the control section 5 connected to the repeater 40. Meanwhile, a parallel I-O port 7 is provided on the other side of the control section 5 and connected to a flash memory MEM which serves as a storage section of the external storage apparatus 91 or 92.

Communications between the game machine body 30 and the operation terminal equipments 81 and 82 and external storage apparatus 91 and 92 in the example described above will be described in more detail with reference to FIGS. 1 to 6.

As communications between the game machine body 30 and the operation terminal equipments 81 and 82, a communications starting notification signal DTR of one bit is first transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 via the repeater 40. In response to the communications starting notification signal DTR, though not shown in FIG. 6, a starting acceptance signal DSR is transmitted from the operation terminal equipments 81 and 82 or the external storage apparatus 91 and 92 to the game machine body 30 via the repeater 40. Then, the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 enter a reception waiting condition in which they wait reception of transmission data TXD from the game machine body 30.

Then, transmission data TXD including an identification code of the operation terminal equipments is transmitted from the game machine body 30 to the repeater 40. The identification code is transmitted from the repeater 40 to the operation terminal equipments 81 and 82 and the external storage apparatus 91. However, the external storage apparatus 91 does not respond to succeeding transmission data TXD since the identification code is different from that of the external storage apparatus 91, but only the operation terminal equipments 81 and 82 start communications in response to reception of the identification code.

The transmission data TXD from the game machine body 30 to the operation terminal equipments 81 and 82 are transmitted such that those to the operation terminal equipment 81 and those to the operation terminal equipment 82 are successively transmitted in order beginning with those to the operation terminal equipment 81. Then, those data to the operation terminal equipment 81 are transmitted to the operation terminal equipment 81 by the repeater 40 whereas those data to the operation terminal equipment 82 are transmitted to the operation terminal equipment 82 by the repeater 40. Then, transmission data RXD are transmitted from the operation termi-



nal equipments 81 and 82 to the repeater 40. The repeater 40 adds different identification codes to the individual data from the operation terminal equipments 81 and 82 included in the transmission data RXD. Then, after the transmission data TXD are transmitted from the game machine body 30 to the repeater 40, the transmission data RXD are transmitted from the repeater 40 to the game machine body 30. The transmission data RXD are obtained by collecting the data transmitted from the operation terminal equipments 81 and 82 to the repeater 40 to a group of data.

Communications between the game machine body 30 and the external storage apparatus 91 and 92 are successively performed beginning with the external storage apparatus 91. In particular, first as communications between the game machine body 30 and the external storage apparatus 91, a communications starting notification signal DTR of one bit is first transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 via the repeater 40. In response to the communications starting notification signal DTR, though not shown in FIG. 6, a starting acceptance signal DSR is transmitted from the operation terminal equipments 81 and 82 or the external storage apparatus 91 and 92 to the game machine body 30 via the repeater 40. Then, the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 enter a reception waiting condition for transmission data TXD from the game machine body 30.

Then, an identification code of the external storage apparatus is transmitted as transmission data TXD from the game machine body 30 via the repeater 40. The identification code is transmitted from the repeater 40 to the operation terminal equipments 81 and 82 and the external storage apparatus 91. However, since the operation terminal equipments 81 and 82 have different identification codes from the received identification code, they do not respond to succeeding transmission data TXD, but only the external storage apparatus 91 starts communications in response to reception of the identification code.

Then, the succeeding transmission data TXD are transmitted from the game machine body 30 to the external storage apparatus 91 via the repeater 40. Then, transmission data RXD are transmitted from the external storage apparatus 91 to the game machine body 30 via the repeater 40.

On the other hand, as communications between the game machine body 30 and the external storage apparatus 92, a communications starting notification signal DTR of one bit is first transmitted from the game machine body 30 to the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 via the repeater 40. In response to the communications starting notification signal DTR, though not shown in FIG. 6, a starting acceptance signal DSR is transmitted from the operation terminal equipments 81 and 82 or the

external storage apparatus 91 and 92 to the game machine body 30 via the repeater 40. Then, the operation terminal equipments 81 and 82 and the external storage apparatus 91 and 92 enter a reception waiting condition for transmission data TXD from the game machine body 30.

Then, an identification code of the external storage apparatus is transmitted as transmission data TXD from the game machine body 30 to the repeater 40. The identification code is transmitted from the repeater 40 to the operation terminal equipments 81 and 82 and the external storage apparatus 92. However, since the operation terminal equipments 81 and 82 have different identification codes from the received identification code, they do not respond to succeeding transmission data TXD, but only the external storage apparatus 92 starts communications in response to reception of the identification code.

Then, the succeeding transmission data TXD are transmitted from the game machine body 30 to the external storage apparatus 92 via the repeater 40. Then, transmission data RXD are transmitted from the external storage apparatus 92 to the game machine body 30 via the repeater 40.

FIGS. 7A to 7D illustrate an exemplary construction of a packet of data communicated between the game machine body 30 and the operation terminal equipments 81 and 82 and external storage apparatus 91 and 92. FIG. 7A illustrates data to be transmitted from the game machine body 30 to the operation terminal equipments 81 and 82. The data include a protocol Pro, a command Cmd and a mode Md followed by data of 8 bytes X 4. An identification code of an operation terminal equipment is included in the protocol Pro. FIG. 7B illustrates data to be transmitted from the operation terminal equipments 81 and 82 to the game machine body 30. The data include an identification code ID and an acknowledge Ack followed by data of 8 bytes X 4.

FIG. 7C illustrates data to be transmitted from the game machine body 30 to the external storage apparatus 91 and 92. The data include a protocol Pro, a command Cmd and a mode Md followed by data of 128 bytes. An identification code of an external storage apparatus is included in the protocol Pro. FIG. 7D illustrates data to be transmitted from the external storage apparatus 91 and 92 to the game machine body 30. The data include an identification code ID and an acknowledge Ack followed by data of 128 bytes.

FIGS. 8A to 9D illustrate communication procedures between the game machine body 30 and the external storage apparatus 91 and 92 by a packet described above. In particular, FIG. 8A illustrates a procedure wherein packet data are transmitted from the game machine body 30 to the external storage apparatus 91 and 92 via the repeater 40. First, a protocol Pro and a command Cmd are transmitted from the game machine body 30. The protocol Pro includes an identification code of the external storage apparatus, and the repeater



40 connects the external storage apparatus 91 and 92 corresponding to the identification code to the game machine body 30. Simultaneously with the transmission of the command Cmd, each of the external storage apparatus 91 and 92 transmits a status Status representing a status of the external storage apparatus 91 and 92 and an acknowledge Ack to the game machine body 30 as seen from FIG. 8B. Upon reception of the acknowledge Ack, the game machine body 30 sends out a sector Sec representing a storage position of RAMs in the external storage apparatus, data of 128 bytes and a check sum CS. The external storage apparatus 91 and 92 store the data to the storage position represented by the sector Sec. The external storage apparatus 91 and 92 receive the check sum CS transmitted thereto and transmit an acknowledge Ack and a transmission result Result. By the communication procedure described above, the data sent out from the game machine body 30 are stored into the external storage apparatus 91 and 92.

FIG. 8C illustrates a procedure of transmitting data from the external storage apparatus 91 and 92 to the game machine body 30 via the repeater 40. First, a protocol Pro and a command Cmd are transmitted from the game machine body 30. An identification code of the external storage apparatus 91 and 92, is included in the protocol Pro, and the repeater 40 connects the external storage apparatus 91 and 92 corresponding to the identification code to the game machine body 30. Simultaneously when the command Cmd is transmitted, a status Status and an acknowledge Ack are transmitted from each of the external storage apparatus 91 and 92 to the game machine body 30 as shown from Fig. 8D. Upon reception of the acknowledge Ack, the game machine body 30 sends out a sector Sec indicating a storage position of the RAMs in the external storage apparatus. The external storage apparatus 91 and 92 receive the sector Sec transmitted thereto and transmit an acknowledge Ack, a sector Sec, data of 128 bytes, a check sum CS and a transmission result Result. By the communication procedure described above, the data stored in the storage position section Sec of the external storage means are sent to the game machine body 30.

FIGS. 9A to 9E illustrate communication timings between the game machine body 30 and the operation terminal equipments 81 and 82 and external storage apparatus 91 and 92. FIG. 9B illustrates a transmission timing of operation data from the operation terminal equipment 81 to the game machine body 30. The game machine body 30 accepts transmission of operation data from the operation terminal equipment 81 in response to a vertical synchronizing signal illustrated in FIG. 9A. FIG. 9C illustrates a transmission timing of operation data from the operation terminal equipment 82 to the game machine body 30. Transmission of operation data from the operation terminal equipment 82 is performed continuously to the transmission of operation data from the operation terminal equipment 81 to the game machine body 30. Also where three or more operation terminal

equipments are connected to the game machine body 30, transmission of operation data proceeds in a similar manner. In other words, data of all of the operation terminal equipments are transmitted successively to the game machine body 30 within one vertical synchronization period.

FIG. 9D illustrates a timing of communication of data between the external storage apparatus 91 and the game machine body 30. Communication of data between the external storage apparatus 91 and the game machine body 30 is performed subsequently to the transmission of operation data from all of the operation terminal equipments to the game machine body 30. Then, communication of data between the external storage apparatus 92 and the game machine body 30 is performed in a next vertical synchronizing period as seen from FIG. 9E. In other words, communication between the external storage apparatus and the game machine body 30 performed such that, within one vertical synchronizing period, it is performed between only one external storage apparatus and the game machine body 30. When data to be transmitted or received by one transmission operation exceed 128 bytes, communication of the data is performed over a plurality of vertical synchronizing periods. Further, the external storage apparatus 91 and the external storage apparatus 92 are normally communicated with the game machine body 30 alternately every other vertical synchronizing period.

With the game machine system described above, the two external storage apparatus 91 and 92 can be connected to the repeater 40 simultaneously and such two external storage apparatus 91 and 92 are provided in a one-by-one corresponding relationship to the two operation terminal equipments 81 and 82 connected to the repeater 40 so that individual data of the operation terminal equipments 81 and 82 are stored into the external storage apparatus 91 and 92, respectively. Consequently, there is no necessity of re-connecting an external storage apparatus for each operation terminal equipment connected to the repeater 40, and a sufficient capacity can be assured for the storage capacity which can be used for each one operation terminal equipment.

The game machine system may be modified such that, for example, four terminal equipment-connectable transmission-reception sections 61 to 64 are provided for the repeater 40 as shown in FIGS. 10, 11 and 12 so that operation terminal equipments 81 to 84 may be connected to the terminal equipment-connectable transmission-reception sections 61 to 64, respectively.

Referring first to FIG. 10, the modified game machine system shown includes four storage apparatus-connectable transmission-reception sections 71 to 74 as the storage apparatus-connectable transmission-reception sections of the repeater 40 such that external storage apparatus 91 to 94 can be connected to the storage apparatus-connectable transmission-reception sections 71 to 74, respectively. In this instance, the external storage apparatus 91 to 94 are provided in a one-



by-one corresponding relationship to the operation terminal equipments 81 to 84 so that individual data of the operation terminal equipments 81 to 84 may be stored into the external storage apparatus 91 to 94, respectively.

Meanwhile, the modified game machine system shown in FIG. 11 includes eight storage apparatus-connectable transmission-reception sections 71 to 78 provided as the storage apparatus-connectable transmission-reception sections of the repeater 40 such that external storage apparatus 91 to 98 may be connected to the storage apparatus-connectable transmission-reception sections 71 to 78, respectively. In this instance, the external storage apparatus 91 to 98 are provided in an one-by-two corresponding relationship to the operation terminal equipments 81 to 84 such that individual data of the operation terminal equipment 81 may be stored into the external storage apparatus 91 and 92; individual data of the operation terminal equipment 82 may be stored into the external storage apparatus 93 and 94; individual data of the operation terminal equipment 83 may be stored into the external storage apparatus 95 and 96; and individual data of the operation terminal equipment 84 may be stored into the external storage apparatus 97 and 98.

Where individual external storage apparatus have a comparatively large capacity, the game machine system may be modified in such a manner as shown in FIG. 12. Referring to FIG. 12, the modified game machine system includes a pair of storage apparatus-connectable transmission-reception sections 71 and 72 provided as the storage apparatus-connectable transmission-reception sections of the repeater 40 such that a pair of external storage apparatus 91 and 92 may be connected to the storage apparatus-connectable transmission-reception sections 71 and 72, respectively. In this instance, the external storage apparatus 91 and 92 are provided in a two-by-one corresponding relationship to operation terminal equipments 81 to 84 such that the external storage apparatus 91 may store data of the operation terminal equipments 81 and 82 and the external storage apparatus 92 may store data of the operation terminal equipments 83 and 84.

The corresponding relationship between operation terminal equipments and external storage apparatus may be determined, in place of being determined from a physical positional relationship between the terminal equipment-connectable transmission-reception sections of the repeater 40 to which the operation terminal equipments are connected and the storage apparatus-connectable transmission-reception sections of the repeater 40 to which the external storage apparatus are connected, arbitrarily by designation of the game machine body 30.

Having described embodiments of the invention, it will be apparent to one of ordinary skill in the art that many changes and modifications can be made thereto without departing from the scope of the invention as set

forth herein.

## Claims

1. A repeater for a game machine, comprising:

an operation terminal equipment-connectable transmission-reception section for transmitting and receiving data to and from a plurality of operation terminal equipments;  
an external storage apparatus-connectable transmission-reception section for transmitting and receiving data to and from a plurality of external storage apparatus corresponding to said plurality of operation terminal equipments;  
a game machine-connectable transmission-reception section for serially transmitting and receiving data to and from a game machine body; and  
control means for selectively connecting said game machine-connectable transmission-reception section to said operation terminal equipment-connectable transmission-reception section or said external storage apparatus-connectable transmission-reception section.

2. A repeater for a game machine according to claim 1, wherein said operation terminal equipments transmit and receive data to and from said operation terminal equipment-connectable transmission-reception section by serial communication.

3. A repeater for a game machine according to claim 1, wherein said external storage apparatus transmit and receive data to and from said external storage apparatus-connectable transmission-reception section by serial communication.

4. A repeater for a game machine according to claim 1, wherein said control means transmits data of said plurality of operation terminal equipments inputted from said operation terminal equipment-connectable transmission-reception section collectively at a time to said game machine body.

5. A repeater for a game machine according to claim 1, wherein said game machine-connectable transmission-reception section is connected to an operation terminal equipment-connectable transmission-reception section of said game machine body.

6. A repeater for a game machine according to claim 1, wherein said operation terminal equipments and said plurality of external storage apparatus corresponding to said operation terminal equipments are attached to positions of said repeater at which a corresponding relationship between said operation ter-



terminal equipments and said plurality of external storage apparatus can be identified.

7. A repeater for a game machine according to claim 2, wherein said operation terminal equipment-connectable transmission-reception section is connected for communication to said plurality of operation terminal equipments for each one vertical synchronization period. 5
8. A repeater for a game machine according to claim 3, wherein said external storage apparatus-connectable transmission-reception section is connected for communication to said plurality of external storage apparatus one by one for each one vertical synchronization period. 10 15
9. A game system, comprising:
  - a game machine body having an operation terminal equipment-connectable connection section; and 20
  - a repeater connectable to said operation terminal equipment-connectable connection section by serial communication and allowing connection thereto of a plurality of operation terminal equipments and a plurality of external storage apparatus individually corresponding to said plurality of operation terminal equipments by serial communication; 25 30
  - said repeater including control means for selectively connecting said plurality of operation terminal equipments and said plurality of external storage apparatus connected thereto to said game machine body. 35

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FIG. 1

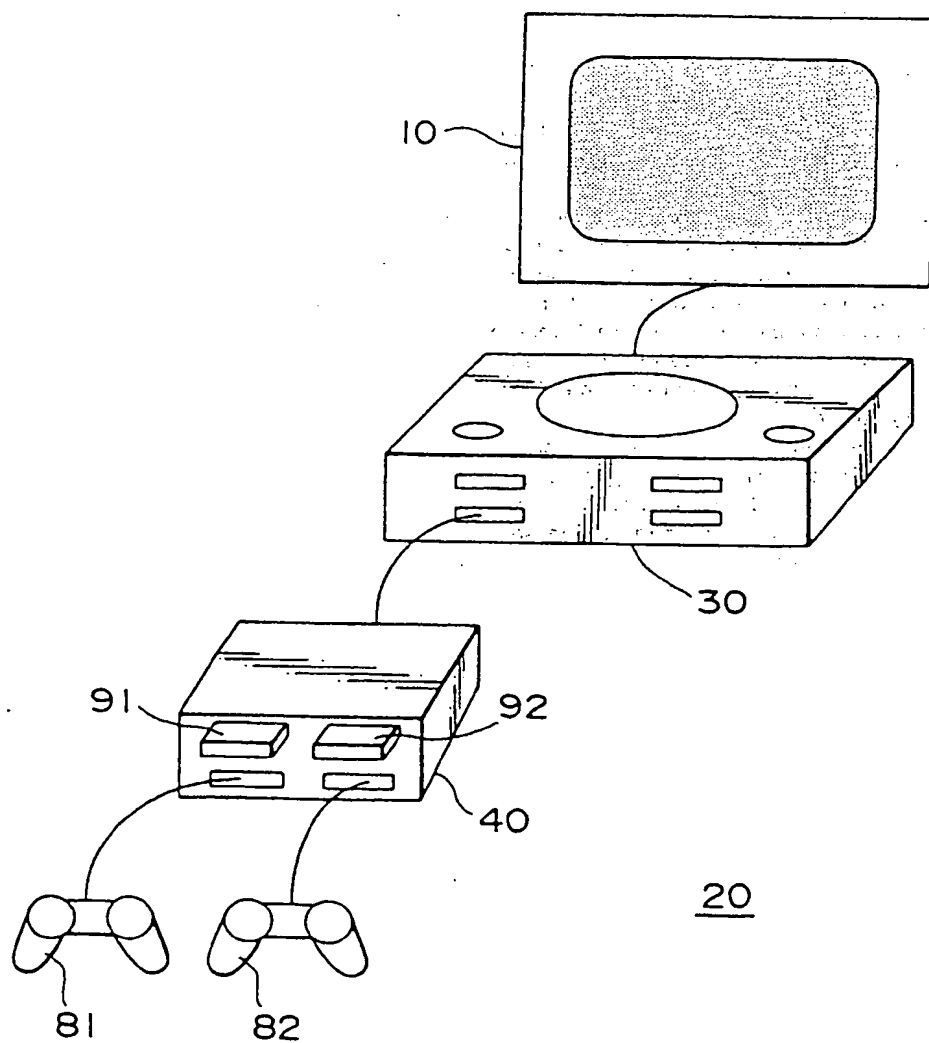




FIG. 2

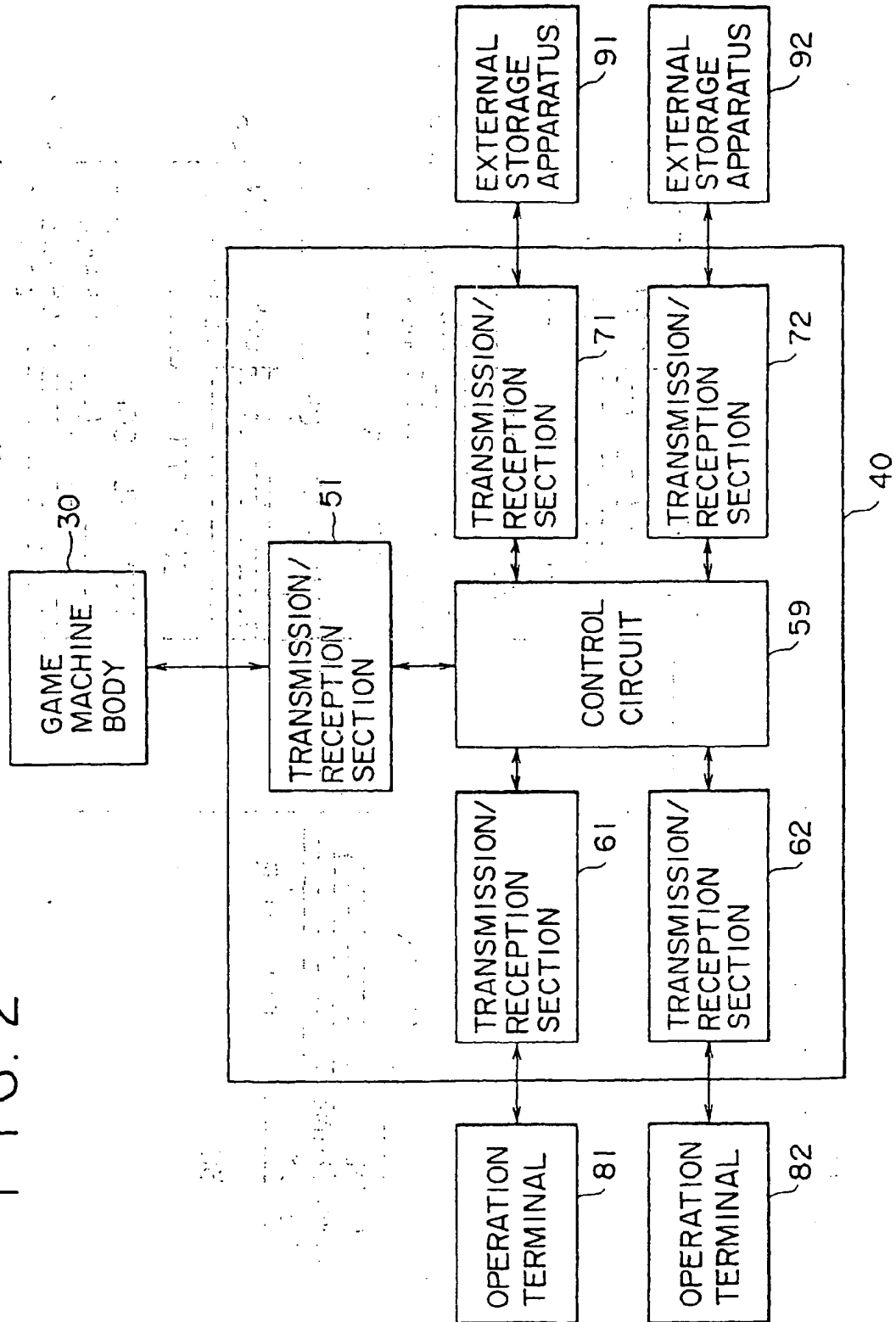




FIG. 3

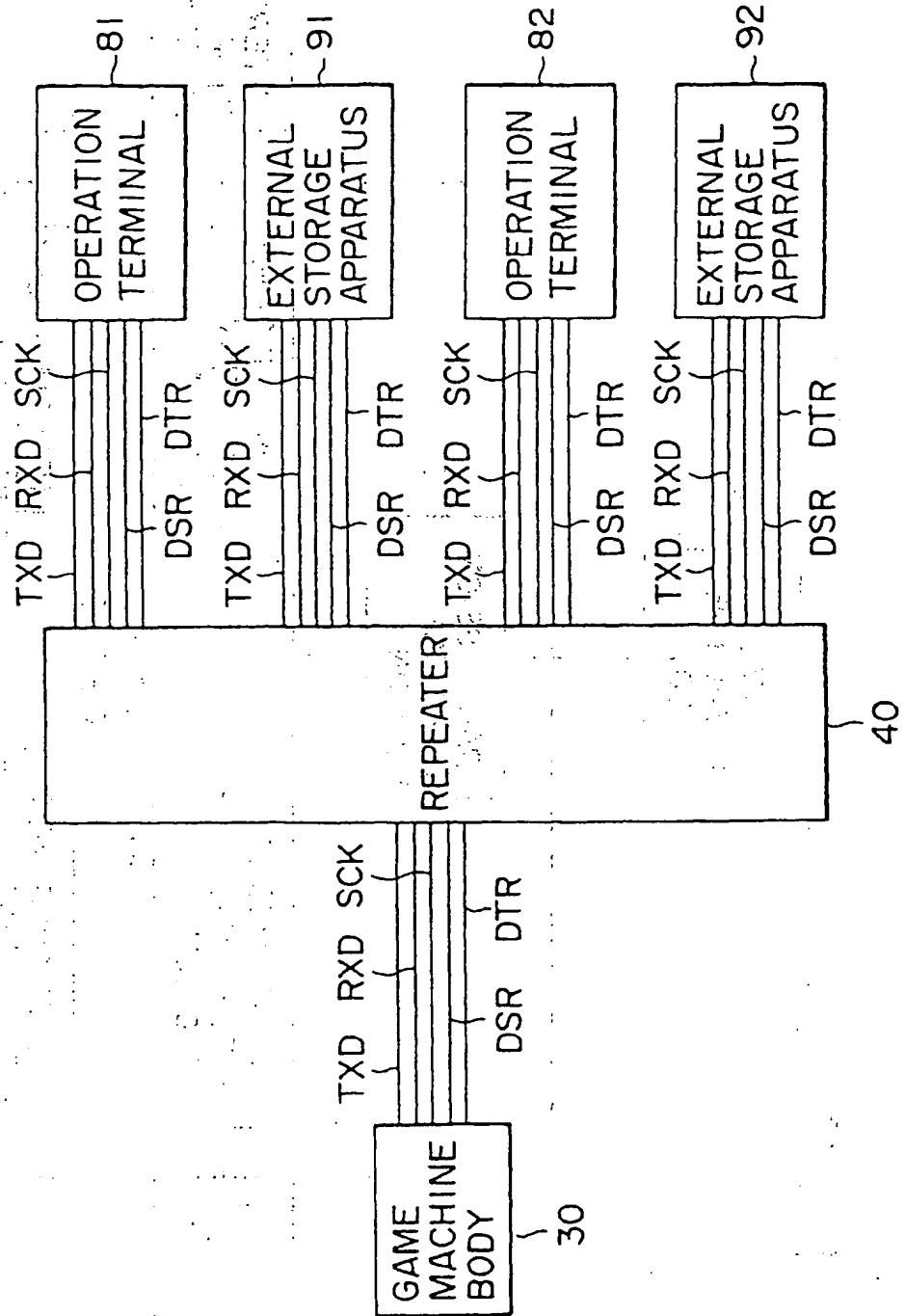




FIG. 4

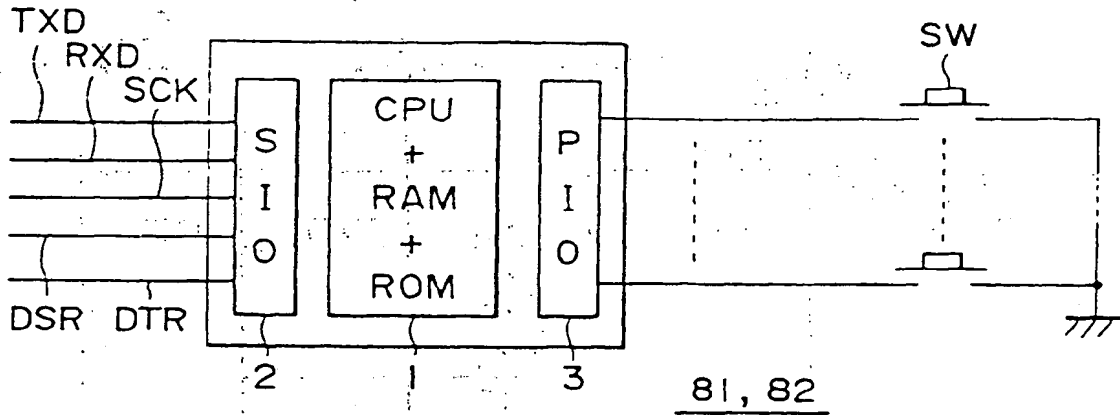
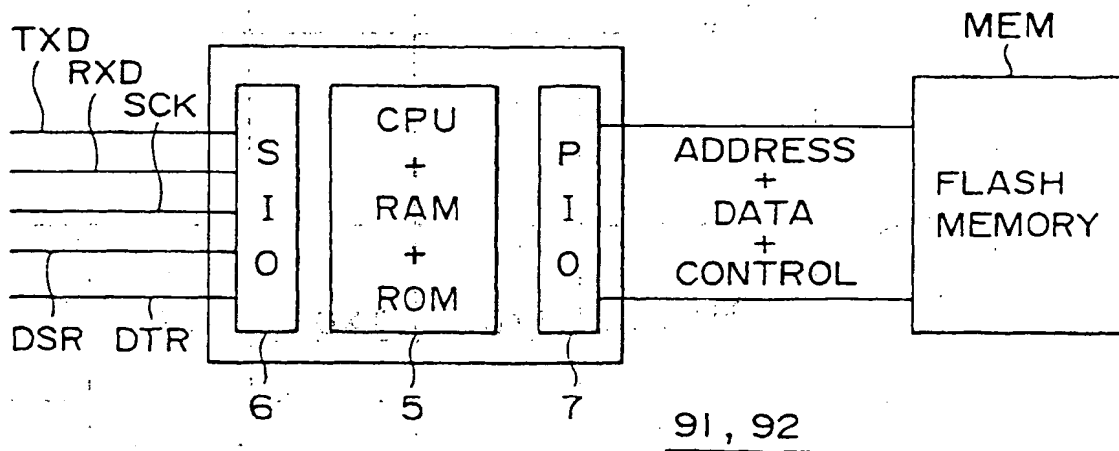


FIG. 5





# FIG. 6

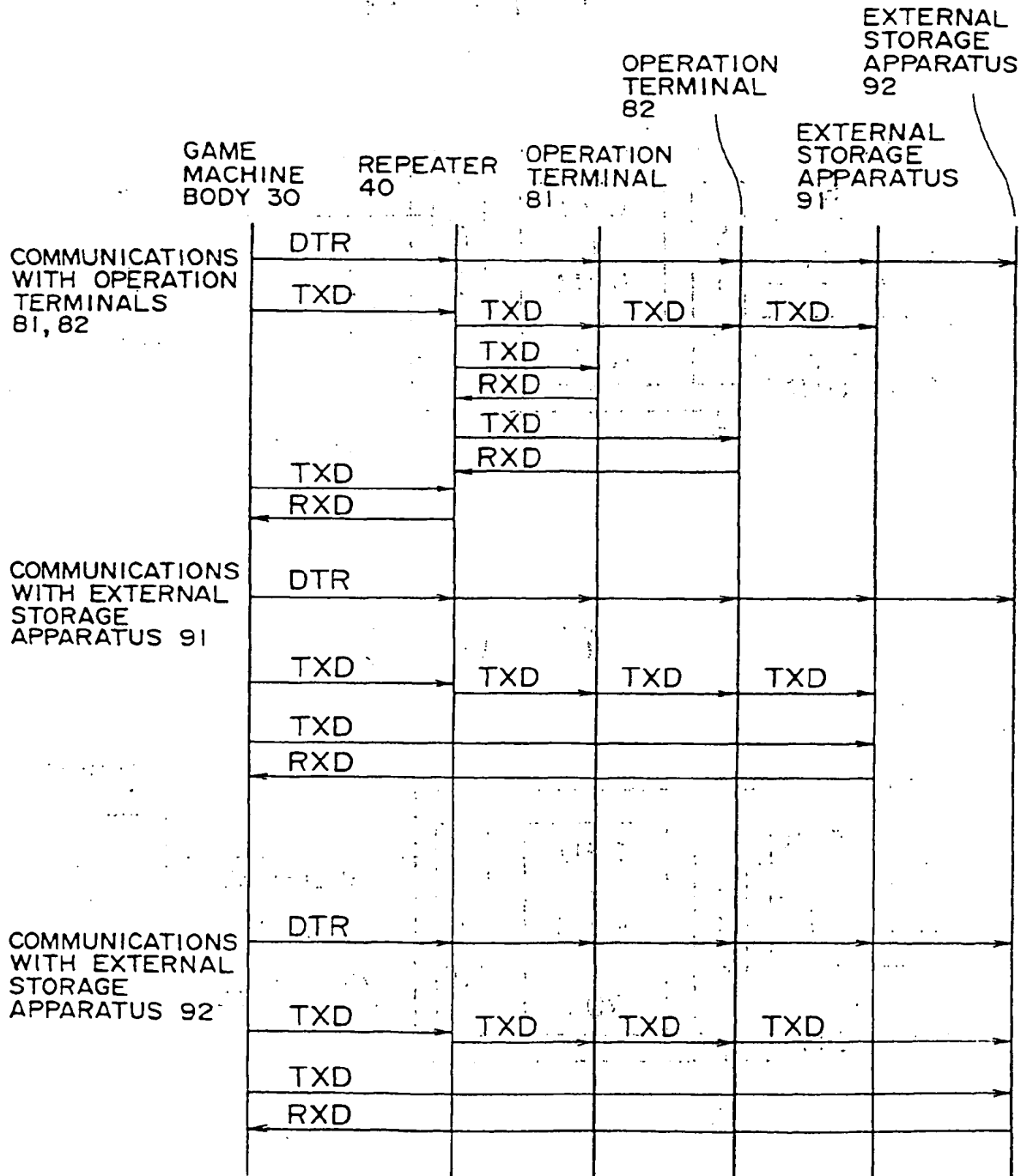




FIG. 7A

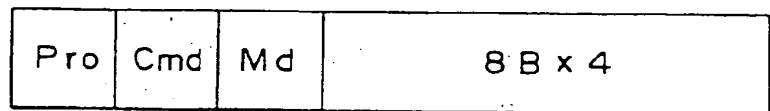


FIG. 7B



FIG. 7C



FIG. 7D

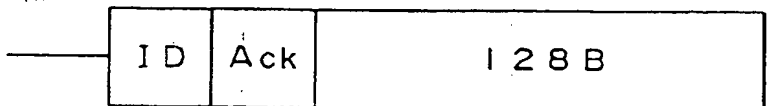




FIG 8A

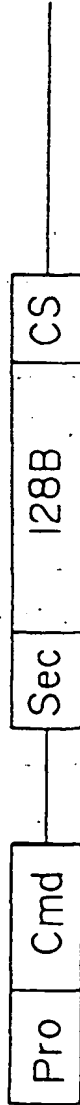


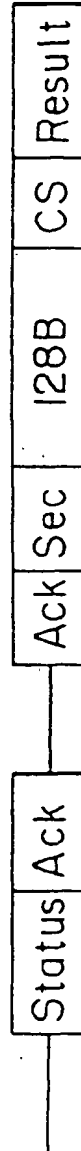
FIG. 8B



FIG. 8C



FIG. 8D





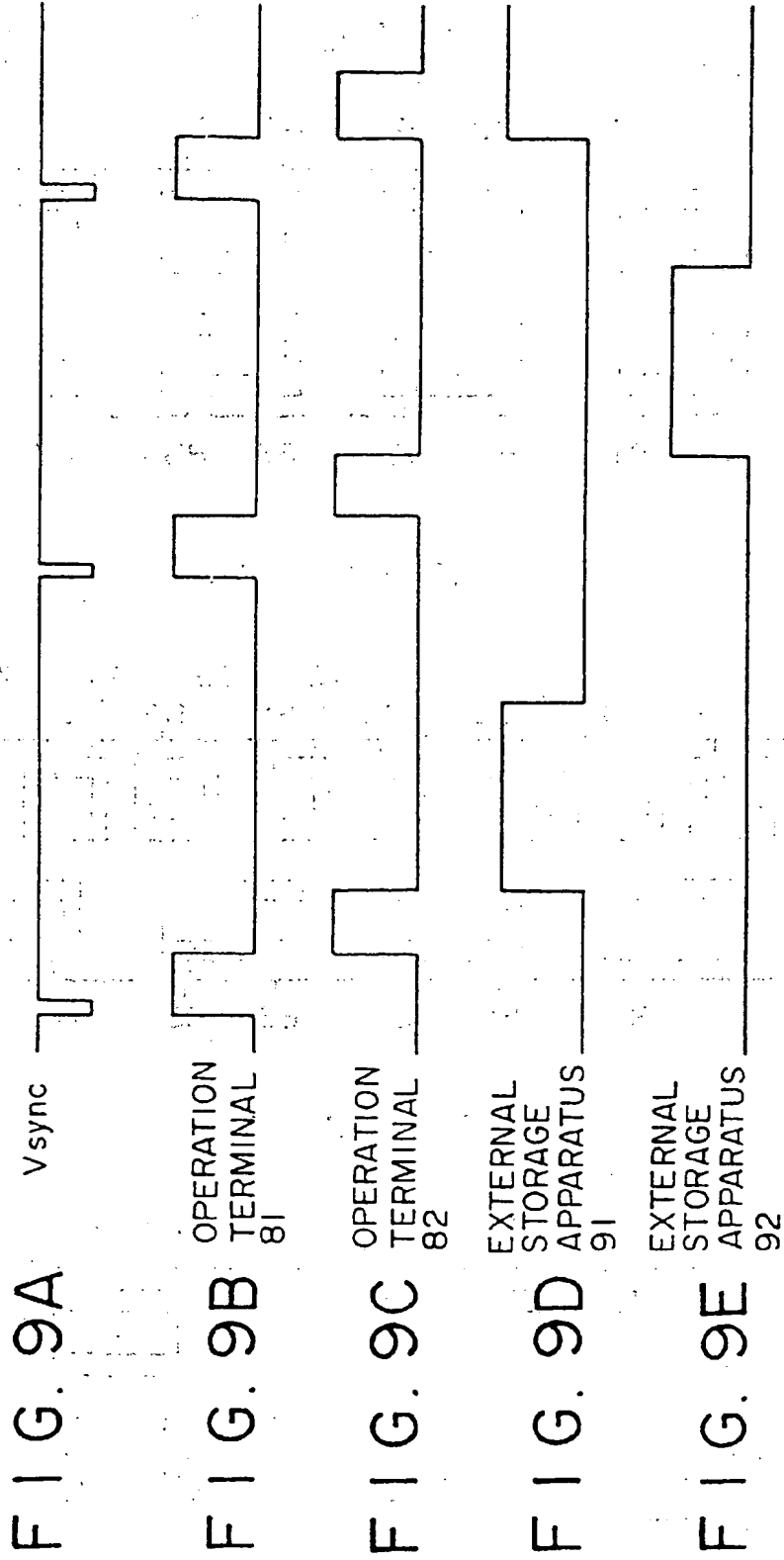




FIG. 10

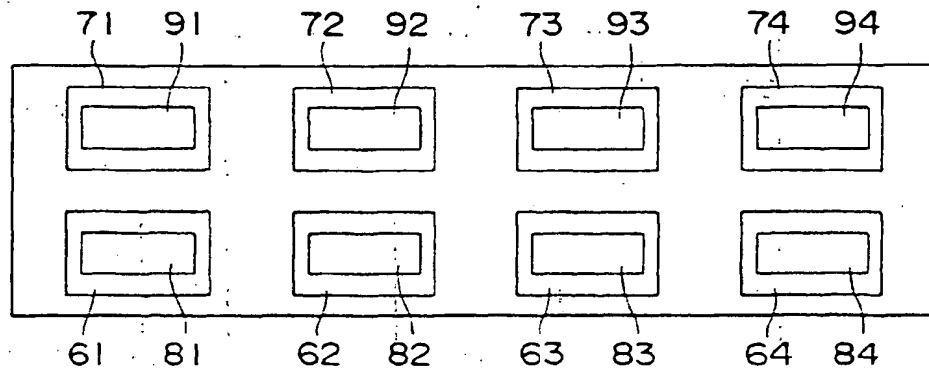


FIG. 11

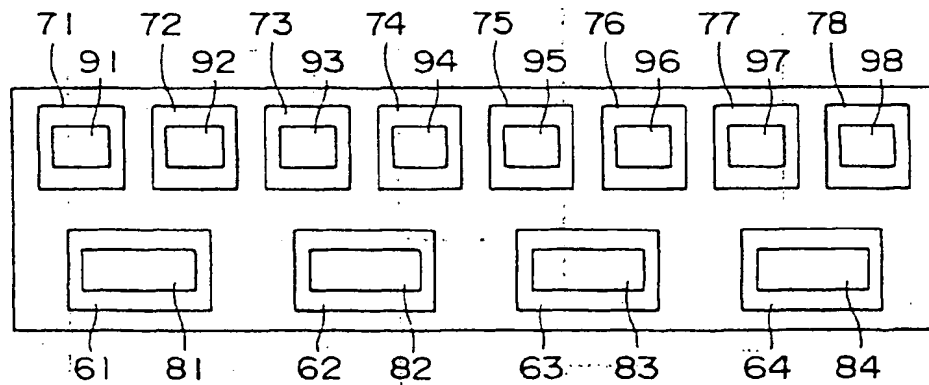
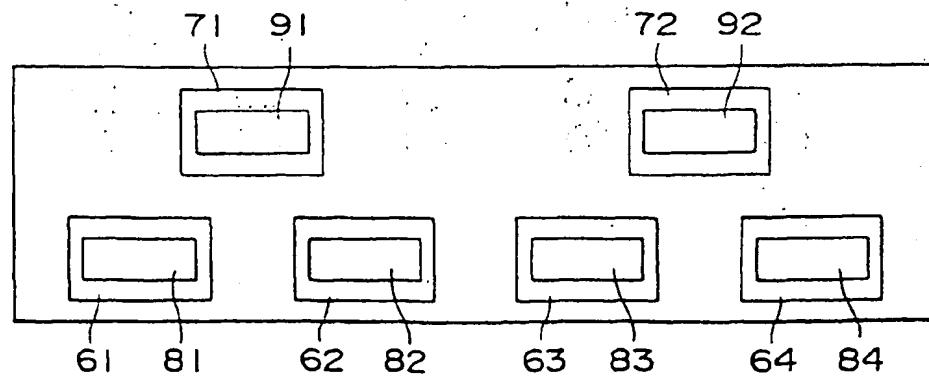


FIG. 12







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 96 30 0312

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category   | Citation of document with indication, where appropriate, of relevant passages                                  | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
|--|--|-------------------|--|
| X  | WO-A-88 08167 (LEE DATA)<br>* page 1, line 35 - page 3, line 11;<br>figures 1,2                                | 1-6,9             | G06F13/40<br>A63F9/22                        |
| X  | GB-A-2 185 607 (BARCREST)<br>* page 1, left-hand column, line 11 - page 3, left-hand column, line 35; figure 1 | 1-6,9             |  |
| A  | EP-A-0 208 319 (WANG LABORATORIES)<br>* page 6, paragraph 3 - page 9, paragraph 2; figures 2,3 *               | 1-6,9             |  |
| A  | US-A-4 588 187 (WICO CORP)<br>* column 2, line 55 - column 3, line 48;<br>figures 1,2                          | 1-6,9             |  |
| The present search report has been drawn up for all claims |  |                   | TECHNICAL FIELDS<br>SEARCHED (Int.Cl.6)      |
|  |  |                   | G06F<br>A63F                                 |

|   |   |                            |
|---|---|----------------------------|
| Place of search<br><b>THE HAGUE</b>   | Date of completion of the search<br><b>9 May 1996</b> | Examiner<br><b>Gill, S</b> |
| <b>CATEGORY OF CITED DOCUMENTS</b><br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>I : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |   |                            |

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